

# ANNUAL REPORT FOR 2003



**Cedar Point Mitigation Site  
Carteret County  
Project No. 6.16901T  
TIP No. R-2105 AB**



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## TABLE OF CONTENTS

|   |           |
|---|-----------|
| <b>SUMMARY</b> .....                                  | <b>1</b>  |
| <b>1.0 INTRODUCTION</b> .....                         | <b>2</b>  |
| 1.1 Project Description .....                         | 2         |
| 1.2 Purpose .....                                     | 2         |
| 1.3 Project History .....                             | 2         |
| <b>2.0 HYDROLOGY</b> .....                            | <b>4</b>  |
| 2.1 Success Criteria .....                            | 4         |
| 2.2 Hydrologic Description .....                      | 4         |
| 2.3 Results of Hydrologic Monitoring.....             | 4         |
| 2.3.1 Site Data.....                                  | 4         |
| 2.3.2 Climatic Data .....                             | 7         |
| 2.4 Conclusions.....                                  | 7         |
| <b>3.0 VEGETATION</b> .....                           | <b>9</b>  |
| 3.1 Success Criteria .....                            | 9         |
| 3.2 Description of Species.....                       | 9         |
| 3.3 Results of Vegetation Monitoring.....             | 10        |
| 3.4 Conclusions.....                                  | 11        |
| <b>4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS</b> ..... | <b>11</b> |

### FIGURES

|   |          |
|---|----------|
| <b>FIGURE 1. SITE LOCATION MAP</b> .....              | <b>3</b> |
| <b>FIGURE 2. GAUGE LOCATION MAP</b> .....             | <b>5</b> |
| <b>FIGURE 3. PLOT OF DAILY FLOODING PATTERN</b> ..... | <b>6</b> |
| <b>FIGURE 4. 30-70 PERCENTILE GRAPH</b> .....         | <b>8</b> |

### APPENDICES

**APPENDIX A. GAUGE DATA GRAPHS**

**APPENDIX B. SITE PHOTOS AND PHOTO POINT LOCATIONS**

## **SUMMARY**

The Cedar Point Mitigation Site, located in Carteret County, will serve as mitigation for marsh impacts within the White Oak River Basin. Located adjacent to NC 24, the site was constructed in 2002 and is in its second year of monitoring following construction. The site was monitored in 2003 for both hydrologic and vegetation success.

Hydrologic monitoring consisted of examining the data from two onsite surface gauges. The primary hydrologic input is surface water from an onsite channel that is connected to open water. Therefore, the hydrologic success criteria are based on site flooding. The site must flood twice daily with the same frequency and duration as adjacent marsh systems.

An examination of the water levels over a two-day period illustrates that the site floods twice daily in average to above average climatic conditions (Figure 3). The two days in the plot were chosen at random and are representative of typical conditions during the growing season.

Data interruptions from both surface gauges (July 28-September 23) were caused by limitations in the storage capabilities of the gauges. Currently, the surface gauges are set to record hourly water levels. Future downloads will reflect 3-hour intervals, thus alleviating the data interruption problem.

Due to minimal planted vegetation observed during 2002, supplemental planting was performed in May 2003. Subsequently, vegetation survival appears to be improving.

NCDOT will continue to monitor for hydrology and vegetation at the Cedar Point Mitigation Site.

## 1.0 INTRODUCTION

### 1.1 Project Description

The Cedar Point Mitigation Site is located in Carteret County adjacent to both NC 24 and the White Oak River (Figure 1). The site was designed as an emergent marsh; a constructed channel within the site promotes tidal exchange within the mitigation area. The Cedar Point Site provides upfront mitigation to offset future impacts in the White Oak River Basin.

### 1.2 Purpose

In order to demonstrate successful mitigation, both the hydrologic and vegetation conditions of a new site must be monitored. This report details the hydrologic and vegetation monitoring on the Cedar Point Mitigation Site in 2003; this is the second year that the site has been monitored following construction.

### 1.3 Project History

|                     |                                       |
|---------------------|---------------------------------------|
| March-May 2002      | Site Construction                     |
| May 2002            | Site Planted                          |
| June 2002           | Surface Gauges Installed              |
| June-December 2002  | Hydrologic Monitoring (1 yr.)         |
| August 2002         | Vegetation Monitoring (1 yr.)         |
| May 2003            | Site Tilled and Supplemental Planting |
| March-November 2003 | Hydrologic Monitoring (2 yr.)         |
| August 2003         | Vegetation Monitoring (1yr. Restart)  |



## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

Though most mitigation sites are monitored according to federal wetland hydrology criteria, NCDOT and cooperating agencies decided that the Cedar Point Mitigation Site should be evaluated using different criteria. This is due mainly to the fact that the site is located on the coast and it receives its primary hydrologic input from an onsite channel that is connected to open water. The site's flooding regime, if it is consistent with that outside the mitigation area, will determine hydrologic success. The site must be flooded twice daily and have the same elevation and duration as flooding outside the mitigation area in order to be considered successful. The site will be monitored for three years or until success criteria are met. Local rainfall is monitored to ensure site success in average local climate conditions, though rainfall is not the primary hydrologic input. Available mitigation plan documents and site design sheets show pre-project conditions.

### **2.2 Hydrologic Description**

Due to the site's proximity to the White Oak River, as well as the constructed channel designed to increase tidal exchange, the Cedar Point Site is monitored by surface water gauges (Figure 2). These gauges should indicate if the site is flooded twice daily as is required for success. The flooding regime of the site is expected to be the same as that measured for the biological benchmarks for *Spartina alterniflora*, since it can reflect long-term tidal fluctuations. A rain gauge was not installed as surface water is the primary hydrologic input to this site.

### **2.3 Results of Hydrologic Monitoring**

#### **2.3.1 Site Data**

Appendix A contains plots of data recorded at both of the surface gauges on the site. The plots show the depth of surface water recorded by each gauge.

Figure 3 is a surface water plot of the data recorded at both gauges over a two-day period (selected at random). This figure is to illustrate that flooding occurs twice daily as required in the permit conditions. The two days in the plot were chosen at random and are representative of conditions throughout the growing season.

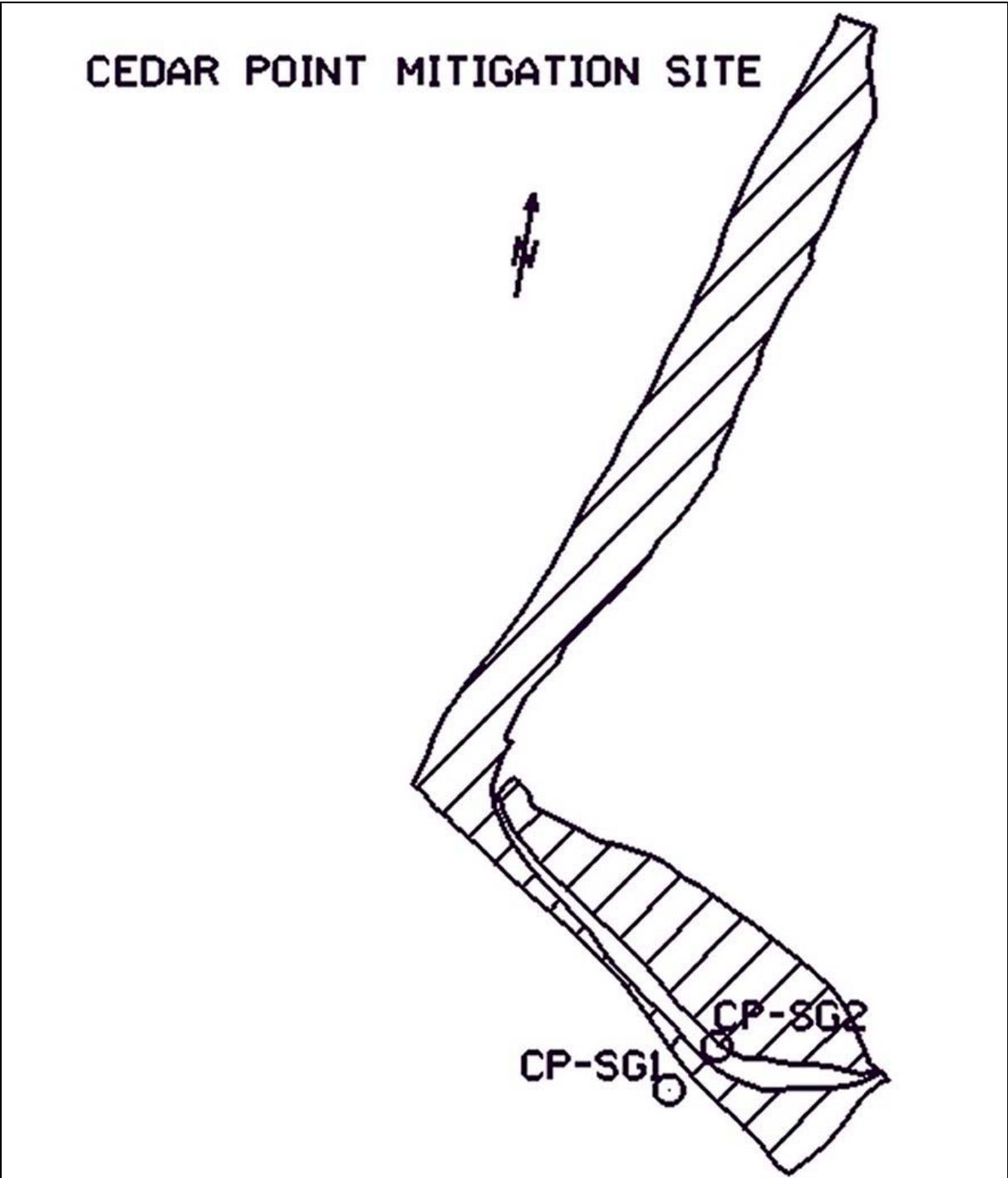
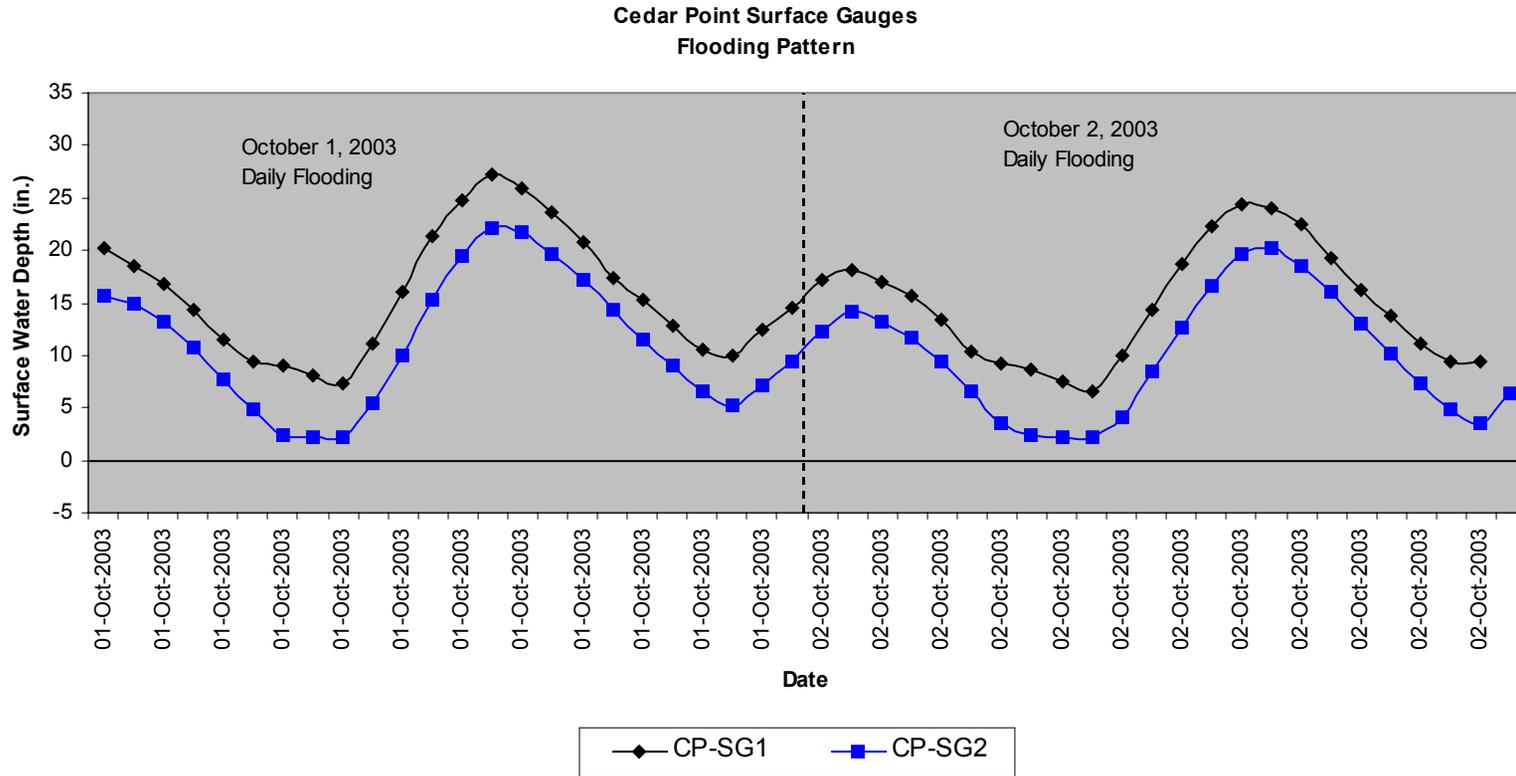


Figure 2. Gauge Location Map

Figure 3. Plot of Daily Flooding Pattern (2-day period shown)



### **2.3.2 Climatic Data**

Figure 4 is a comparison of monthly rainfall (November 2002- August 2003) to historical precipitation for the area. The rainfall data for the months of (September-November 2003) were not included in the graph. The two lines represent the 30<sup>th</sup> and 70<sup>th</sup> percentiles of monthly precipitation for Morehead City, NC. These percentiles represent monthly rainfall data collected between 1972 and 2003 that was provided by the State Climate Office of North Carolina at NC State University.

For the 2003-year, March, April, May, June, July, September, and October experienced above average rainfall. The months of December (02') and January recorded below average rainfall for the site. November (02'), February, August, and November experienced average rainfall. Overall, the site met hydrologic criteria in a year of average to above average climate conditions. However, precipitation is not the primary hydrologic input for the site; thus, it is expected that the site would show the required flooding regardless of area rainfall totals.

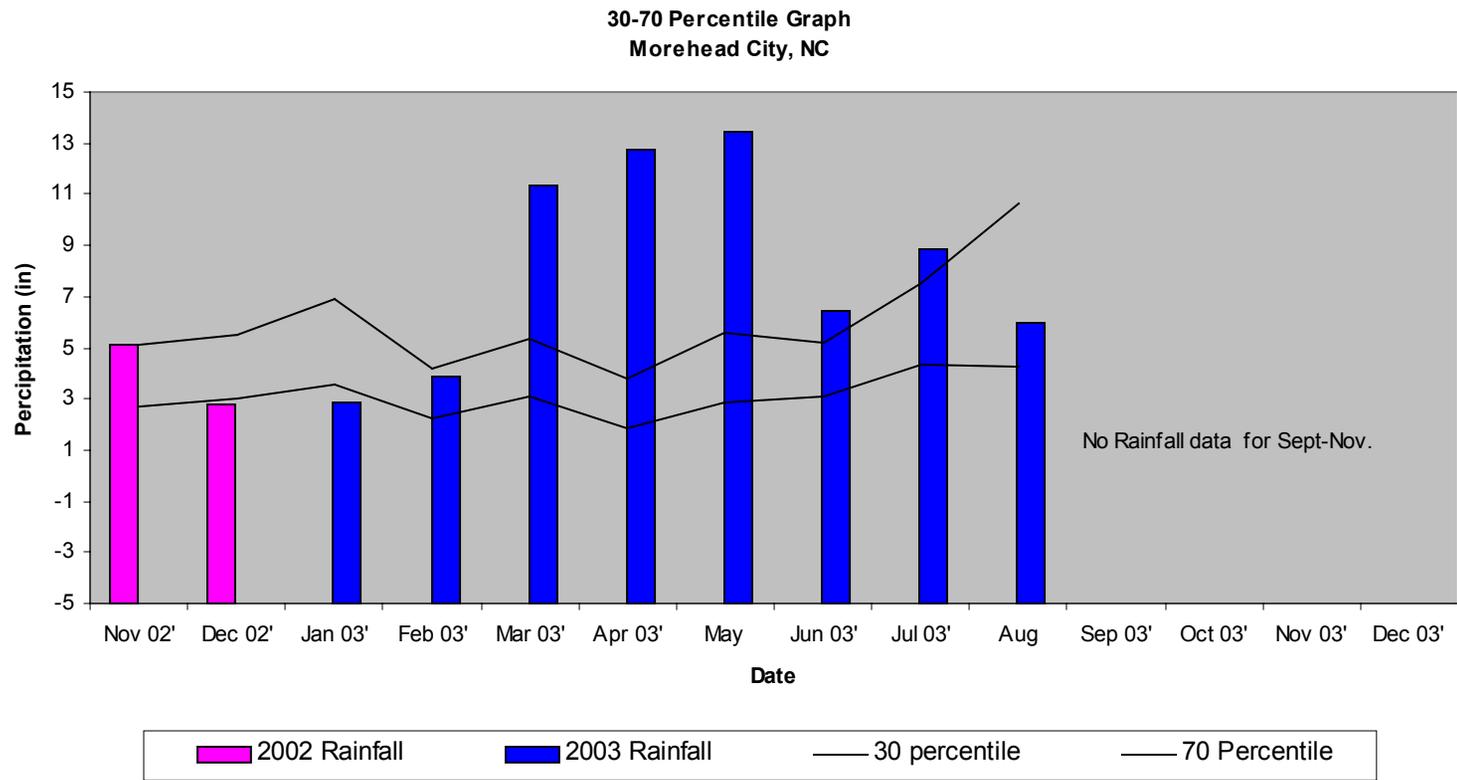
### **2.4 Conclusions**

The surface gauges indicate that the site is being flooded twice daily during the growing season. An examination of the water levels over a two-day period (Figure 3) illustrates that the site floods twice daily in average to above average climatic conditions (as required for success criteria). The two days in the plot were chosen at random and are representative of typical conditions during the growing season.

Data interruptions (July 28-September 23) were caused by limitations in the storage capabilities of the surface gauges. Currently, the surface gauges are set to record hourly water levels. Future downloads will reflect 3-hour intervals, thus alleviating the data interruption problem. Gauge (SG-1) was found washed away; therefore, the gauge was not downloaded for the period from March 13-July 27.

NCDOT will continue hydrology monitoring at Cedar Point Mitigation Site.

Figure 4. 30-70 Percentile Graph



### **3.0 VEGETATION: CEDAR POINT MITIGATION SITE (YEAR 1 MONITORING)**

#### **3.1 Success Criteria**

The site will be considered a success if the calculated value for frequency is 5.0 and the calculated value for average percent cover is at least 80% by the end of the fifth growing season.

#### **3.2 Description of Species**

The following species were planted in the Wetland Restoration Area:

*Spartina alterniflora*, Smooth Cordgrass

*Spartina patens*, Salt Meadow Hay

### 3.3 Results of Vegetation Monitoring

| Plot #   | Scale Factor | <i>Spartina patens</i> | <i>Spartina alterniflora</i> | Frequency | Comments    |
|--|--------------|------------------------|------------------------------|-----------|-------------|
| 1  | 3.0          |                        | ✓                            | ✓         |             |
| 2  | 3.0          |                        | ✓                            | ✓         |             |
| 3  | 2.0          |                        | ✓                            | ✓         |             |
| 4  | 1.0          |                        | ✓                            | ✓         |             |
| 5  | 0.0          |                        |                              |           | Bare Ground |
| 6  | 0.0          |                        |                              |           | Bare Ground |
| 7  | 1.0          |                        | ✓                            | ✓         |             |
| 8  | 0.0          |                        |                              |           | Bare Ground |
| 9  | 0.0          |                        |                              |           | Bare Ground |
| 10   | 2.0          |                        | ✓                            | ✓         |             |
| 11   | 3.0          |                        | ✓                            | ✓         |             |
| 12   | 3.0          |                        | ✓                            | ✓         |             |
| 13   | 4.0          |                        | ✓                            | ✓         |             |
| 14   | 0.0          |                        |                              |           | Bare Ground |
| 15   | 3.0          | ✓                      | ✓                            | ✓         |             |
| 16   | 1.0          |                        | ✓                            | ✓         |             |
| 17   | 1.0          |                        | ✓                            | ✓         |             |
| 18   | 1.0          |                        | ✓                            | ✓         |             |
| 19   | 5.0          |                        | ✓                            | ✓         |             |
| 20   | 3.0          |                        | ✓                            | ✓         |             |
| 21   | 5.0          |                        | ✓                            | ✓         |             |
| 22   | 3.0          |                        | ✓                            | ✓         |             |
| 23   | 3.0          |                        | ✓                            | ✓         |             |
| 24   | 3.0          |                        | ✓                            | ✓         |             |
| 25   | 0.0          |                        |                              |           | Bare Ground |
| 26   | 3.0          |                        | ✓                            | ✓         |             |
| 27   | 3.0          |                        | ✓                            | ✓         |             |
| 28   | 4.0          |                        | ✓                            | ✓         |             |
| 29   | 3.0          |                        | ✓                            | ✓         |             |
| 30   | 3.0          |                        | ✓                            | ✓         |             |
| Frequency (Percentage of Plots with Desired Species) |              | 3.3%                   | 80.0%                        | 80.0%     |             |
| Sum Scale Value                                      |              |                        |                              | 66.0      |             |
| Total Number of Plots                                |              |                        |                              | 30        |             |
| Vegetative Cover (Scale Value)                       |              |                        |                              | 2.2       |             |

### **3.4 Conclusions**

The site was tilled and fertilized and supplemental planting was performed on the site in May 2003. Subsequently, vegetation survival appears to be improving. Frequency and coverage are on track. *Spartina alterniflora* is coming in naturally at higher elevations outside the silt fence.

NCDOT will continue to monitor vegetation on the Cedar Point Mitigation Site.

### **4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS**

The second year of hydrology monitoring indicates that the Cedar Point Mitigation Site is functioning as expected. The surface gauges indicate that the site is being flooded twice daily during the growing season. An examination of the water levels over a two-day period (Figure 3) illustrates that the site is flooding twice daily in average to above average climatic conditions (as required by the success criteria). The two days in the plot were chosen at random and represent typical conditions during the growing season.

Due to minimal planted vegetation observed during 2002, supplemental planting was performed in May 2003. Subsequently, vegetation survival appears to be improving.

NCDOT will continue to monitor for hydrology and vegetation at the Cedar Point Mitigation Site.

**APPENDIX A**  
**GAUGE DATA GRAPHS**

**APPENDIX B**  
**SITE PHOTOS AND PHOTO POINT LOCATIONS**

# Cedar Point



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5

